U.S. Department of Transportation

Federal Aviation Administration

Advisory Circular

Subject: LOW-IMPACT RESISTANT (LIR) STRUCTURES

Date: April 6, 2007 **AC No:** 150/5345-45C

Initiated by: AAS-100 **Change:**

1. PURPOSE. This advisory circular (AC) contains the Federal Aviation Administration (FAA) specifications for low-impact resistant (LIR) structures used to support approach lighting systems (ALS) at airports.

2. EFFECTIVE DATE. As this version only contains administrative changes to AC 150/5345-45B, the effective date for AC 150/5345-45B of March 5, 2007 remains the effective date for this version. Effective March 5, 2007 only equipment qualified per the specifications herein will be listed per AC 150/5345-53, *Airport Lighting Equipment Certification Program.*

3. CANCELLATION. AC 150/5345-45B, *Low-Impact Resistant (LIR) Structures*, dated September 5, 2006 is canceled.

4. APPLICATION. The specifications contained in this AC are recommended by the FAA in all applications involving development of this nature. For airport projects receiving Federal funds under the airport grant assistance or the passenger facility charge programs, the use of these specifications is mandatory.

NOTE: *In addition to the products that meet the performance specifications contained herein, products that attain qualification to the standards of FAA-E-2702 and FAA Drawings D-6155-1 through 46 are considered as alternatively meeting the requirements of this AC.*

5. PRINCIPAL CHANGES. The following principal changes are incorporated:

Administrative corrections have been made to paragraphs 1.1b(1), 3.1, 3.2, 3.2.1, 3.7, 3.9g and 4.2.1 and to the NOTE of paragraph 4 of the AC cover.

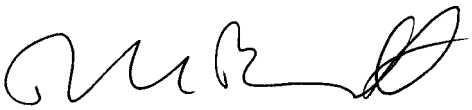
6. METRIC UNITS. To promote an orderly transition to metric units, this AC includes both English and metric dimensions. The metric conversions may not be exact equivalents, and until there is an official changeover to the metric system, the English dimensions will govern.

7. COMMENTS OR SUGGESTIONS for improvements to this AC should be sent to:

Manager, Airport Engineering Division
Federal Aviation Administration
ATTN: AAS-100
800 Independence Avenue, S.W.
Washington, DC 20591

8. COPIES OF THIS AC. The Office of Airport Safety and Standards is in the process of making ACs available to the public through the Internet. These ACs may be found through the Federal Aviation

Administration (FAA) home page (www.faa.gov). A printed copy of this and other ACs can be ordered from the U.S. Department of Transportation, Subsequent Business Office, Annmore East Business Center, 3341 Q 75th Avenue, Landover, MD, 20785.



DAVID L. BENNETT
Director of Airport Safety and Standards

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SECTION 1. SCOPE.

This AC presents the requirements and qualification tests for low-impact resistant (LIR) structures used in supporting approach lighting systems (ALS) and other airport equipment.

1.1 Classification.

This AC covers the following types and styles:

a. Type L-891 - Frangible support structures (lower to service).

(1) Style 1: support structure from 6 feet (ft.) 1 inch (in.) (1.85 meters (m)) to 21 ft. 1 in. (6.43 m).

(2) Style 2: support structure 21 ft. 2 in. (6.45 m) to 30 ft. 0 in. (9.14 m).

(3) Style 3: support structure from 30 ft. 1 in. (9.17 m) to 40 ft. 0 in. (12.19 m).

b. Type L-892 - Frangible support structure (lower to service) mounted on a rigid steel tower.

(1) For elevations above 40 ft. 1 in. (12.21 m), a 20 ft. (6.1 m) ± 1.50 in. (38.10 millimeters (mm)) frangible tower must be mounted on a rigid steel tower.

NOTE: *If located in the Runway Safety Area (RSA), all structure base mechanical mounting points (including rigid steel towers for Type L-892) must be compatible with frangible mounting devices that provide for a frangibility point no greater than 3 inches above surrounding grade. See AC 150/5300-13, Airport Design, for additional information about RSA dimensions and frangibility requirements.*

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SECTION 2. APPLICABLE DOCUMENTS.

The following documents form part of this specification and are applicable to the extent specified.

2.1 FAA Orders, Specifications, FAA Drawings, and Advisory Circulars (ACs).

Order 6850.2	*Visual Guidance Lighting Systems*
FAA-E-2325E	*Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights*
FAA-E-982	*PAR-56 Lamp Holder*
FAA-E-2702	*Low-impact Resistant Structures*
FAA Drawings	FAA Drawings D-6155-1 through 46, *ALSF-2 (6'-128') & MALSR (6'-128') L.I.R. Structures, Light Mounting Height 6'-1" - 128'-0" Structure Configurations*
AC 150/5345-53	*Airport Lighting Equipment Certification Program*
AC 150/5300-13	*Airport Design*

2.2 Military and Federal Publications.

2.2.1 Military Specifications.

MIL-A-8625	*Anodic Coatings, for Aluminum and Aluminum Alloys*
MIL-PRF-85285	*Coating, Polyurethane, Aircraft and Support Equipment*

2.2.2 Military Standard.

MIL-STD-810F	*Environmental Engineering Considerations and Laboratory Tests*

2.2.3 Federal Standard.

FED-STD-595	*Colors Used in Government Procurement*

2.3 American Society for Testing and Materials (ASTM) Publications.

ASTM A123	*Standard Specification for Zinc (Hot-Dip Galvanized Coatings on Iron and Steel Products)*
ASTM A153	*Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware*
ASTM A325	*Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength*
ASTM D518	*Standard Test Method for Rubber Deterioration-Surface Cracking*

ASTM D3951 *Standard Practice for Commercial Packaging*

2.4 American National Standards Institute/Telecommunications Industry Association (ANSI/TIA)

ANSI/TIA-222-G (August 2005) *Structural Standards for Steel Antenna Towers and Antenna Supporting Structures*

2.5 Aluminum Association, Inc.

ASD-1 *Aluminum Standards and Data*

FAA ACs may be obtained from:

U.S. Department of Transportation
Subsequent Distribution Office
Ardmore East Business Center
3341 Q 75th Ave.
Landover, MD 20785

Telephone: (301) 322-4961
FAX: (301) 386-5394
Website: www.faa.gov/airports_airtraffic/airports/resources/advisory_circulars/

FAA Orders, Specifications and Drawings may be obtained from:

Federal Aviation administration
ATO-W CM - NAS Documentation
Control Center
800 Independence Avenue, SW
Washington, D.C. 20591

Telephone: (202) 548-5502
FAX: (202) 548-5501
Website: www.faa.gov/cm/dcc

Military Standards and Specifications may be obtained from:

DAPS/DODSSP
Building 4, Section D
700 Robbins Avenue
Philadelphia, PA 19111-5094

Telephone: (215) 697-2179
FAX: (215) 697-1460
Website: dodssp.daps.dla.mil/quicksearch

Federal standards and specifications may be obtained from:

Federal Supply Services
Specification Section
470 L'Enfant Plaza East
SW Suite 8100
Washington, DC 20407

Telephone: (202) 619-8925
FAX: (202) 619-8985
Website: assist.daps.dla.mil/quicksearch

ASTM standards may be obtained from:

ASTM International
100 Barr Harbor Drive
PO Box C700
West Conshohocken, PA 19428-2959

Telephone: (610) 832-9585
FAX: (610) 832-9555
Website: www.astm.org/cgi-bin/SoftCart.exe/index.shtml?E+mystore

Aluminum Association, Inc. publications may be obtained from:

The Aluminum Association, Inc.
1525 Wilson Boulevard
Suite 600
Arlington, VA 22209

Telephone: (703) 358-2960
FAX: (703) 358-2961
Website: www.aluminum.org (Electronic Bookstore)

ANSI/TIA publications may be ordered from:

Website: www.tiaonline.org/standards/catalog/

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SECTION 3. REQUIREMENTS.

3.1 General.

LIR structures are intended for use with airport lighting systems to support various lighting fixtures from 6 feet (ft) 1 inch (in) (1.85 meters (m)) to 40 ft. 0 in. (12.19 m) above terrain (Type L-891). Where terrain variations exceed 40 ft. 1 in. (12.21 m), a Type L-892 structure must be used. The structures (excepting the Type L-892 rigid steel tower base) must be frangible in design and break, distort or yield in the event of an accidental impact with an aircraft during landing or take-off operations. Structures must also be designed not to become entangled with the aircraft (example: the structure wraps around the wing of an aircraft after it is struck) or otherwise cause damage that impairs the safe operation of the aircraft.

Where the height of a supporting structure exceeds 40 ft. 1 in. (12.21 m) (Type L-892), the frangibility requirement only applies to the top 20 ft. (6.1 m).

Where non-frangible objects surround a supporting structure, only the part of the structure that extends above the surrounding objects must be frangible.

LIR structures may also be used to support other airport equipment in areas where frangibility is mandatory.

3.2 Equipment Supplied by the Manufacturer.

The structures must be supplied complete with all accessories, including mounting base, adjusting and connecting hardware, light bars where required, and installation instructions. The supplied equipment must also include structure lowering and raising hardware for Type L-891and L-892 (one lifting device per LIR structure system with the exception of structures where the mast is lowered vertically, Type L-892).

3.2.1 Lamp Attaching Hardware

a. All PAR-56 lamp attaching hardware and lamp supports for the LIR structure must be compatible with the requirements in FAA-E-982, *PAR-56 Lamp Holder*, and FAA Drawing D-6155-2.

b. All PAR-38 lamps attaching hardware and lamp supports must be per the requirements in FAA-E-2325E, *Medium Intensity Approach Lighting System with Runway Alignment Indicator (MALSR).*

3.3 Environmental Conditions.

The LIR structures, components and all necessary equipment must withstand exposure to the following environmental conditions without the failure of the structure or any frangible parts.

3.3.1 Wind.

The structures and all necessary equipment must be designed to withstand pressure loading (no permanent deformation) arising from the following wind velocities when installed with all lighting equipment attached. Structures must be designed to withstand the following velocities (3 second gust per ANSI/TIA-222-G (August 2005), Annex L, *Wind Speed-Conversions (Normative))*: up to 75 miles per hour (mph) (121 kilometers per hour (kph)) with 0.5 in. (13 mm) of ice on all surfaces, 100 mph (161 kph) without ice.

3.3.2 Temperature.

The structures, components and all necessary equipment must be designed to withstand temperatures from -67 degrees Fahrenheit (F) (-55 degrees Celsius (C)) to 131 degrees F (55 degrees C).

3.3.3 Relative Humidity.

The structures, components and all necessary equipment must be designed to withstand any relative humidity from 5 percent to 100 percent including condensation.

3.3.4 Sunshine.

This requirement is applicable to structures, components and any necessary equipment using plastic or non-metallic components. The structures, components and necessary equipment must withstand prolonged exposure to solar radiation.

3.3.5 Salt Spray.

The structures, components and all necessary equipment must be designed to withstand exposure to a corrosive salt laden environment.

3.3.6 Vibration.

The components of the LIR structure must be designed so that no component or combination of components (up to and including the entire structure) will vibrate at or near their resonant frequency and exceed the deflection requirements in paragraph 3.11 when subjected to the wind load requirements in 3.3.1.

3.4 Materials.

3.4.1 Aluminum.

Aluminum structures must be constructed of anodized aluminum alloys with a matte finish. All aluminum alloys, except aluminum castings, must be manufactured of alloy 6061-T6 and 6061-T6511 per Aluminum Association ASD-1, A*luminum Standards and Data.* Aluminum castings must be alloy A356-T6 per ASD-1.

3.4.2 Glass Reinforced Plastic (GRP).

Structures constructed of GRP or equivalent suitable lightweight materials must meet the dimensional and performance requirements in paragraphs 3.3, 3.5.3, 3.9, 3.11, 3.12 and all qualification requirements in Section 4.

3.4.3 Stainless Steel.

All hardware components (except hardware that is specifically designated as aluminum or carbon steel) must be 18-8 stainless steel.

3.4.4 Steel Hardware.

All carbon steel high strength structural bolts and nuts must be suitable for the application and per ASTM A325.

3.4.5 Non-metallic Connections.

Drilled holes and cut edges of the GRP members must be coated with the same material as the original resin.

3.4.6 Rubber.

All rubber or rubber-like materials used with LIR structures must meet the requirements of ASTM D518, Method B.

3.5 Fabrication.

LIR structures and members must not have sharp edges that could be hazardous during handling or any other irregularities that could interfere with fit and assembly. All bonding areas, whether metallic or nonmetallic, must be sandblasted and cleaned with a solvent before applying a structural adhesive.

3.5.1 Galvanizing.

All ferrous metal parts (except stainless steel) must be hot-dip galvanized after fabrication per ASTM A123. Steel surfaces must be sandblasted to base metal before galvanizing. Ferrous hardware (nuts, bolts, washers, and other minor items) must be galvanized by the hot-dip method conforming to ASTM A153.

3.5.2 Anodizing.

All aluminum structure members must be anodized with a matte finish in accordance with MIL-A-8625, Type II, Class 1.

3.5.3 Painting.

All GRP or equivalent performing material structure members must be coated with a 4.0 to 6.0 mil (38 to 51 micrometer (µm)) thickness polyurethane coating per MIL-PRF-85285 or equivalent. The color must be orange 12197, per FED-STD-595. For all GRP members, except where specifically indicated otherwise, the orange pigment and UV light absorber must be incorporated into the resin per FAA-E-2702. Prior to application of the coating, all ridges, knots, bumps, and bulbs must be removed by sanding or machining and the surface cleaned with a suitable solvent.

3.6 Lamp Fixture Load.

The lamp fixtures to be installed on the structures consist of several configurations that are illustrated in FAA Order 6850.2, *Visual Guidance Lighting Systems*, Section 2. The PAR-56 lamp holder must be per FAA-E-982 and weigh 6.5 pounds (lb) (3.0 kilograms (kg)) with the lamp installed. The PAR-38 lamp holder must be per FAA-E-2325E and weigh approximately 2.75 lb (1.25 kg) with the lamp installed. The structures may be designed to support the various lamp configurations using single or multiple members.

3.7 Height.

Type L-891 structures must be designed to permit the installation of lights to any height from 6 ft. 1 in. (1.85 m) to a maximum of 40 ft. 0 in. (12.19 m). Type L-892 structures must use a 20 ft. ± 1.50 in. (6.1 m ± 38.1 mm) support structure mounted to a rigid steel tower (the rigid steel tower height will depend on the installation). The design must permit a final height adjustment of ±8.0 in. (20.3 centimeters (cm)).

3.8 Weight.

Structures must be designed to be the minimum weight possible and meet the requirements of paragraphs 3.3, 3.4, 3.9, 3.11, 3.12 and the qualification testing requirements of Section 4.

3.9 Frangible Structure Design Goals.

a. The structures must be designed with the minimum mass possible to support a maximum lamp load (see FAA Order 6850.2 Part 1 for approach lighting system lamp configurations) under the environmental conditions described in paragraph 3.3, yet be frangible when accidentally struck from any direction and cause the minimum possible structural damage to an aircraft. When it is struck, the structure must be designed to break, yield, or distort and not entangle or otherwise limit the safe maneuverability of the aircraft.

b. The structures must be designed to be frangible when subjected to the sudden collision forces of an aircraft with a mass of 6613.8 pounds (3000 kilograms) traveling at 75.6 knots (140 kilometers per hour (kph)) during flight.

c. When struck, the support structures must not exert a force on the aircraft greater than 10,116 pounds force (lbf) (45 kilo Newtons). The maximum energy imparted to the aircraft during the contact time (approximately 100 milliseconds) between the aircraft and the structure should not exceed 40,566 foot pounds (ft lbs) (55 kilo joules).

d. Electrical cabling must be designed to disconnect so that the aircraft is not entangled and the frangibility of the structure is not compromised.

e. The maximum light load installed on the structure must be considered as part of the frangible design.

f. Structures must be tested with base mounting points connected to frangible fittings per note in this paragraph.

g. If the LIR structure is mounted on a rigid tower for installations that require a height of more than 40 ft. 1in. (12.21m), the frangibility requirement must only apply to the top 20 ft. (6.1 m).

NOTE: *If located in the Runway Safety Area (RSA), all structure base mechanical mounting points (including rigid steel towers for Type L-892) must be compatible with frangible mounting devices that provide for a frangibility point no greater than 3 inches above the surrounding grade. See AC 150/5300-13, Airport Design, for additional information about RSA dimensions and frangibility requirements.*

3.10 Assembly.

The structures must be made in sections to provide easy shipment and handling, yet not compromise the design integrity. The sections must be designed for rapid field assembly without the use of any special tools. Welding together structure sections in the field is not permitted.

3.11 Deflection.

When subjected to a wind velocity of 60 mph (97 kph) (3 second gust) and coated with 0.5 inch (13 mm) of ice, all Types and Classes of structures must be sufficiently rigid to prevent more than ±2 degrees deflection of the light beam source in the vertical axis and no more than ±5 degrees in the horizontal axis.

3.12 Maintainability.

The structures must be designed to be the minimum weight possible (while meeting all other requirements of this specification) to permit maintenance of the lights without the use of additional equipment (for example: man-lifting machines or separate ladders).

3.12.1 Lower to Service Type.

The structures may be designed to be lowered to ground level or by lowering only the lighting equipment. While at ground level, the design must permit the lights to be aligned horizontally. In addition, the design must also permit proper mounting and not restrict the adjustment range of lamp holders in paragraph 3.2.1. All lowering equipment must be supplied as part of the structure and be considered as integral to the structure when concerned with weight and frangibility. The lighting equipment must retain its original horizontal and vertical alignment and be securely locked in place after maintenance operations.

3.13 Structure Foundations.

The structure foundations will normally be concrete. The base of each structure must be secured to the foundation. Leveling of each structure must be by simple adjustments.

NOTE: *If located in the Runway Safety Area (RSA), all structure base mechanical mounting points (including rigid steel towers for Type L-892) must be compatible with frangible mounting devices that provide for a frangibility point no greater than 3 inches above the surrounding grade. See AC 150/5300-13, Airport Design, for additional information about RSA dimensions and frangibility requirements.*

3.14 Ground Wire Lug.

A copper lug sized for a #6 ground wire connection must be provided and secured to the structure base.

3.15 Lamp Wiring.

Each lamp will require two No. 12 wires (supplied by installing activity). The structures must be designed so there will be no exposed electrical wires. All wire must be enclosed in wireways that are designed as part of the structure. The wireways and wiring must be part of the frangible design requirements in paragraph 3.9 and not cause the structure to wrap around the impacting object.

3.16 Cleaning.

The surfaces of all materials must be free from grease, oil, dirt, scale, flux, and chemicals that are deposited during the fabrication process.

3.17 Instruction Booklet.

An instruction booklet must be provided that includes all necessary procedures for unpacking, assembly, installation, operation, recommended maintenance practices, and a complete parts list.

SECTION 4. QUALIFICATION REQUIREMENTS.

4.1 Equipment Qualification Procedure.

Procedures for obtaining equipment qualification are in AC 150/5345-53, *Airport Lighting Equipment Certification Program.* The third party certification body must make a permanent record (for the life of the certification) of the exact material and fabrication process used for the prototype submitted. Any change in material or fabrication process requires the certification of the resultant product as a new product being submitted for certification. After testing and qualification are complete, the prototype submitted for qualification must serve as the dimensional and workmanship model for all subsequent production units.

4.2 Qualification Tests.

4.2.1 Visual Examination.

All structure components must be visually inspected for quality of workmanship, finish, and adequacy for the intended purpose.

4.2.2 Salt Spray Test.

The salt spray test must be conducted on a section of the structure mast, complete with all accessory hardware per MIL-STD-810F, Method 509.4, paragraph 4.5.2, Procedure I. The test duration must be 48 hours exposure and 48 hours drying. Any evidence of damage, rust, pitting, corrosion (except for sacrificial coatings), or GRP de-lamination is cause for rejection.

4.2.3 Sunshine Test.

The sunshine test must be conducted per MIL-STD-810F, Method 505.4, paragraph 4.4.3, Procedure II, for all structures with plastic/non-metallic exterior materials. The material must be subjected to a minimum of 56 radiation cycles. Any evidence of deterioration or GRP de-lamination is cause for rejection.

NOTE: *A certificate of compliance from the manufacturer attesting that the material has previously passed this test may be submitted to the third party certification body for approval in lieu of performing the test.*

4.2.4 Deflection Test.

A static load calculated from a wind velocity of 60 mph (97 kph) (3 second gust) and 0.5 inch (13 mm) of ice must be applied perpendicular to the vertical axis of a Type L-891, Style 3 structure (maximum height) that is assembled and installed per actual use. The deflection of the structure must not exceed the values in paragraph 3.11. Permanent deformation of the structure is not allowed.

4.2.5 LIR Structure Frangibility Test.

The LIR structure must be tested with all attaching parts and a maximum light fixture load (see paragraph 3.9a). Structure base frangible hardware must also be included (see note in paragraph 3.13). The third party certification body will select what structure type and class is to be tested dependent upon the available test facilities.

4.2.5.1 Test Instrumentation and Procedure

a. Impactor. The impactor must be a rigid semicircular mild steel tube that is 3.28 ft (1 m.) long or 5 times the cross sectional dimension of the tower. The outer diameter of the tube must be 9.8 in. (250 millimeters (mm)) maximum with a minimum wall thickness of 1.0 inch (25.4 mm). The impactor must be attached to the test vehicle so that the impact with the structure is as characteristic of a rigid body as possible.

b. Load cells. Load cells must be installed as closely as possible to the impactor. The number of load cells must be sufficient to ensure a measurement if the impactor deviates from its center-line or the occurrence of unanticipated moments that arise from interaction with the structure or its base. The load cells must be capable of recording a force of 10,116 pounds force (45 kilo Newtons).

NOTE: A recommended recording rate of at least 10 kHz is recommended to accurately capture the impact force.

c. High speed video/movie camera. A high-speed camera must be used to capture the collision of the impactor with the structure. The frame rate must be sufficient for the recording to allow observation and document the failure mode of the structure over a 100 millisecond contact time.

NOTE: It is not possible to visually monitor the impact sequence and resulting deformation of the structure.

d. Impact speed. The test vehicle/impactor must be capable of achieving a speed of 87 miles per hour (140 kph). Impact speed must be constant and recorded at the moment of impact.

e. Impact location. The impactor or the structure must be positioned so that impact occurs 13.1 ft. (4 meters) above ground level or 3.28 feet (1 meter) below the top of the structure whichever is higher.

4.2.5.2 Acceptance/rejection Criteria

a. The LIR structure must not impose a force of greater than 10,116 lbs force (45 kilo Newtons) peak on the impactor per recordings from the load cells. The maximum energy imparted to the impactor by the structure must not exceed 40,566 ft. lbs. (55 kJ) peak during structure contact time.

b. View the high speed video or film recording, verify that the structure does not remain anchored to its foundation and could potentially grasp the wing of the aircraft so that the direction of the aircraft would be adversely affected.

c. The failure mode of the structure must be: fracturing, windowing, or bending.

d. A structure section that wraps around the impactor must not be considered a failure if the section separates from the structure (structure fragments) or the bottom portion of the structure separates from the foundation.

e. Electrical cabling must separate and not impede the fracturing, windowing, or bending of the structure. If the impactor becomes entangled with electrical cabling or structure sections that are held together by the cabling, determine if this would hinder the continued flight and safe operation of an aircraft the size of a Piper Aztec or similar aircraft (approximately 6600 lbs (3000 kg)).

f. Structure fragments after impact should not be of a sufficient mass to cause severe damage to an aircraft (punch a hole through the fuselage, tail surfaces, shatter windows or a wind screen).

g. In lieu of the testing detailed in this section, products that already qualify to the requirements of FAA-E-2702 and FAA Drawings D-6155-1 through 46 are considered as meeting the requirements of this AC.

4.2.6 Strength Validation Test.

A Type L-891, Style 3 structure must be subjected to wind loads derived from the wind velocities in paragraph 3.3.1. The structures must return to their original positions with no permanent deformation after the load is removed.

4.2.7 Maintenance Performance Test.

The manufacturer must assemble and erect a Type L-891, Style 3 structure per the assembly instructions. The structure must demonstrate the proper fit and function of all component parts and the proper raising and lowering of the structure. Before raising or lowering of any structure, the manufacturer must install an equivalent weight for each lamp or flasher on the crossbar. The demonstration must prove to the satisfaction of the third party certification body that maintenance specialists can safely perform all maintenance tasks.

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SECTION 5. PRODUCTION TEST.

5.1 Testing.

All production units must be verified for proper physical dimensions, materials, and quality of workmanship.

5.2 Production Test Records.

The manufacturer must maintain records of the structures verified in paragraph 5.1 for three years. All units must be traceable by serial number or test lot.

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SECTION 6. PREPARATION FOR DELIVERY

6.1 Packaging.

Each structure must be properly packaged to protect small parts and prevent damage and deterioration during shipment. All containers must be clearly marked for content, type, class, and height of the structure. Structure components must be identified on the package label if shipped in more than one container. All package marking and LIR components packaging must be per ASTM D3951, *Standard Practice for Commercial Packaging.*

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